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SURVEY OF SOVIET HEAVY INDUSTRY (22)

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## SURVEY OF SOVIET HEAVY INDUSTRY (22)

This is a series report, published approximately biweekly, which contains items of interest on Soviet heavy industry as reflected in articles, short news items, announcements, etc., appearing in various USSR and other publications. The items contained in this report fall under the broad categories listed below in the table of contents.

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## MACHINE TOOLS

### Wire Bearings

The collective of the repair-bearing plant completed the 10 month plan 15 days before the deadline. One more part of the obligation has been fulfilled ahead of time in honor of the 33rd Anniversary of the Great October Revolution --- the incorporation of new production. Wire bearings for woodworking machine tool plants have been produced. No other plant in the country has produced these bearings. They are 1 m 14 cm in diameter and they are placed on stripping lathes, which strip tree trunks of bark and branches. A special sector has been set up at the shop, which previously only repaired bearings, where mass production of wire bearings has begun. By the end of the year about 300 units will be produced, and next year --- more than 2,000. Today a consignment of new bearings has been shipped to the Bryanskij and Vologodskij Sovnarkhozes. (Vechernaya Moskva 21 October 1960. Full translation).

### Foundry Production

Usually it is noisy, dusty and dirty in foundry shops. The work of the foundrymen is difficult and productivity is low. The foundrymen are working with mould clay and it is difficult for them to keep the work area clean. This was also the case until recently in the pivot sector of the Ural'skiy Motor Vehicle Plant Gray Cast Iron Shop. Now it is no longer recognizable. The sector is clean and the former noise is lacking, except for the rhythmic clattering of semi-automatic machines and the low whistling of pneumatic equipment. Sand blowers and sand guns have been installed and are in operation. They have made it possible to transform the sector and the difficult labor of the pivot men into mechanized and accurate work. Thanks to machinery the labor production at the sector has increased 2 to 2½ times, labor has been facilitated and earnings and skills have been increased. The designs for the unique machinery were developed by the plant engineers jointly with aid from Moscow --- by the workers of the Scientific Research Institute of Motor Vehicle Industry Technology. Much work has been put into this machinery by the head of the tech-

Foundry Production (cont'd)

nical bureau of the foundry shop, Chinfulin, technologist Dudarev and metal worker Ruchkin.

New mechanisms have come to the aid of man at other sectors of the shop also. High-speed runners with an automatic cycle have been installed for the workers engaged in preparing casting clay. Transporters have been set up for transferring the earth and silent electro-vibrators have cut out the tiring noise. The initial success has lent wings to the foundry-men. Now they are thinking of incorporating automation in more complicated and responsible production sectors. Jointly with the above-mentioned institute, the plant has developed, produced and installed an automatic cast-mould line for producing small casting forms. The workers call this line a casting combine. The line is compact, occupies little space and does many operations. Right now the new line is being adjusted. Its planned production is 320 moulds per hour. It replaces 8 highly-skilled moulders and completely eliminates laborious manual operations in producing so-called "flaskless" moulds. The shop foundry-men have obligated themselves to produce the "combine" for the 33rd Anniversary celebration

Foundry Production (cont'd)

of the Great October Revolution. Incorporating several automatic machines the Bryansk motor vehicle builders have produced two of these machines for another machinery plant and are helping the foundry-men install them. The foundry-men of the Moscow Motor Vehicle Plant imeni Likhachev, the Gor'kiy Motor Vehicle Plant, the Khar'kov Tractor Plant and other enterprises have become interested in the new machinery and the experience of the Bryansk men in the area of mechanization and automation of foundry production. Such innovations are within the power of every plant.  
(*Pravda*, 7 October 1960. Full translation)

[\* "bezopochnyy" without a flask or casting box.]

### Cold Press-Working

Thinking of the problem of speeding up technical progress in industry, we should like to express a few thoughts arising nowadays with engineers, technologists. It seems to us that up to the present not enough attention has been given in all-over industrial planning to one of the most progressive branches of modern technology and metal working. This is cold press-working sheet metal, which creates broad possibilities for the full automation of production and is one of the most economical types of metal working. We shall include some data. The modern motor vehicle contains 55 to 70% of its parts produced from cold press-work sheet metal. They are 6 to 10 times less labor consuming than all the various motor vehicle parts and waste metal will not exceed 25%. Efficiently designed products of sheet metal can be stamped out without any waste. No less important is the part played by cold press-working of sheet metal in the production of tractors and other agricultural machinery. Electrical machinery construction, the radio technical industry, instrument building, as well as the production of such appliances as refrigerators, washing machines and others, are nowadays practically

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### Cold Press-Working (cont'd)

unthinkable without the broad use of parts of sheet metal. The following example is also significant: The parts making up the rear axle beam of a 4 to 4½ ton truck, produced of sheet steel, weighs little more than half as much as parts of forged iron. There are many such examples.

Until recently the use of cold press-working was considered effective only under conditions of large production volume, and expenditures for the production of stamps would be amortized. However, domestic and foreign experience proves this to be completely wrong. At present methods are known for lowering the cost of press-working equipment to a considerable degree, even for small-series production. We mean the use of plastics, easily worked alloys, wood in combination with parts of metal and even reinforced concrete. The so-called elemental stamping method has been developed and is successfully in operation in our country at many plants. It consists in the fact that, with the aid of small multi-purpose stamps, one achieves the proper form and size not at once, but by dividing each operation into several simpler ones. With this the same stamps can be used for producing various products, and this leads to a great decrease in expenditures. Unfortunately, serious obstacles are stand-

Cold Press-Working (cont'd)

ing in the path of the broad application of cold press-working in industry. First of all there is a shortage of rolled sheet metal, the percentage of which is lower in the total production of rolled metal in our country than in several foreign countries. According to the Seven Year Plan, as is well known, it is planned to increase the production of sheet metal sharply which will make it possible to eliminate the present disproportion! However, the machinery industry is clearly lagging behind in the production of new, modern types of equipment for working sheet metal. In certain branches of industry, particularly in motor vehicle construction, it is planned to make a transition very soon to work ribbon steel on rolls. This will make it possible to automate production to a greater degree, decrease labor expenditures for preparatory work and save a considerable amount of metal in cutting. It is considered that spool rolling will save about 1,400 tons of sheet steel every year. But we do not yet possess finished-design modern automated units for cutting broad-roll steel ribbon for technological cards and complicated configuration blanks. Things are no better with the production of many modern

Cold Press-Working (cont'd)

types of highly productive automatic presses. Our press plant and organizations which are designing this equipment not only do not have ready designs but even developed technical proposals for such modern press equipment as, for example, block-section or "node" multi-position automatic presses. Our industry needs these automatic machines now. It would make it possible to replace an entire group of ordinary type presses and clear a significant amount of production area. Labor productivity on these presses will increase many fold and production shift from one type to another will be much easier. If one asks press builders and designers why they have not completely fulfilled the requirements of industry for new types of press, they will usually answer that no one has ordered them. But before the need arises for new equipment, enterprises do not have funds to order them. When such a need arises, usually there is no time to wait for new machinery, and the plants seek a method for the best use of old equipment. We shall note that expenditures which are essential for designing and producing new equipment are borne by those enterprises which order

Cold Press-Working (cont'd)

it. Naturally it is more advantageous for a consumer to wait for someone else to do this. The result is a vicious circle. This obviously happens because the Union and Republic Gosplans and the Sovnarkhozes are actually not carrying out the policy for future planning in the field of producing equipment for cold press-work sheet metal. They can retort that there is a long-term plan for the production of new forge-press equipment for the current Seven Year Plan Yes, there is. But there are no operational corrections dictated by actual conditions! But technology is not standing still. Many types of equipment are necessary now, whereas production is planned for the last years of the Seven Year Plan or not provided at all. For example, there are no automatic cutting units in the long-term plan. Thus conjuncture planning of new equipment production for working sheet steel is not being carried out. Since we are talking about specialized equipment, motor vehicle builders often hear the following answer to their complaints: "You can make it yourself." What is true is true. But is it expedient to engage in this instead of making full use of the potential of the repair-mechanical shops for moderniz-

Cold Press-Working (cont'd)

ing the fund of existing equipment and automating production? We might mention that after the motor vehicle constructors produce any new press for themselves, they are immediately compelled to produce a whole series of these presses for other enterprises, sometimes. What happens is that motor vehicle plants are often forced to carry out the functions of heavy machinery plants. Let us see how the needs of industry are being satisfied for various multi-purpose types of highly productive presses. The long-term plan for the production of forge-press equipment provides for the production of automatic presses with underneath drive of nine type sizes with nominal capacities of 10 to 400 tons. Their productivity reaches a total of several thousand units per hour. One skilled worker operates several of these machines at once. These presses are essential to enterprises which produce spare parts for motor vehicles, tractors and other agricultural machinery. However, the range of presses being produced is limited to a 150 ton press. Who knows when other, more powerful presses will be produced.

Analogous is the situation with the production of

Cold Press-Working (cont'd)

multi-purpose multi-positional automatic presses, GOST 8260-56. The Barnaul Mechanical Press Plant, demonstrating initiative in designing and producing several type sizes of this equipment is not receiving the necessary support from planning organs. Presses with overhead drive, very similar in construction to ordinary type presses, but differing from them by automatic feeding, for some reason are not even produced in our country. And there are none in the long term plan. The plan does not even contain rotary presses of the system of engineer Koshkin, although they are a technical innovation in our country.

The workers of the press-working industry have been bringing up the question of the necessity of the centralized production of pipe-mechanisms for automating press equipment for sometime. However, the planning organs have not yet provided a production basis for this. As a result the plants which are using cold press-working are forced to use primitive methods and use their own ingenuity in incorporating automation. In addition, plants in Barnaul and Voronezh which produce press-equipment do not outfit it with type mechanisms for automatic operations. This question must

Cold Press-Working (cont'd)

be brought to a solution and the centralized production of these mechanisms must be organized for presses such as "mechanical hands," various automatic feeders, strip stackers, bunker blank feeders, etc. The centralized production for standardized parts for producing stamps according to unified parts standards should be organized also. In order to speed up technical progress in the field of cold press-working of sheet metal, it is very important to implement specialization not only of plants producing press equipment but also of planning and scientific research organizations. Right now everything is joined under one obsolete term: "Forge-press production." But at the modern stage forge production and press (or stamp) are completely different things. If they are divided organizationally, only good can come of it. We have all the potential of moving up to the front of the field in the area of press-working production. The task consists in increasing the rate and quality of construction of new types of equipment, in forming close ties between top planning organizations and design bureaus of machinery plants engaged in planning and pro-

Cold Press-Working (cont'd)

ducing press equipment for their own needs.

The USSR Council of Ministers Committee on Automation and Machinery Construction should delegate to one of the master planning organizations of press construction, for example, the TsBKM\* in Moscow or Special Design Bureau No. 10 in Voronezh coordination of all operations in planning new equipment. For this it is necessary to form a group of skilled designers who would maintain constant contact with the various enterprises doing planning work and production of presses, aiding the plant designers. All of these could be organized on a self-supporting basis. It is also necessary to improve the standardization of press equipment. It is also important to devote attention to improving coordination of the problems of planning and producing presses received as imports from the people's democracies. For example, in the German democratic Republic we usually order presses in great haste without working out the necessary special technical conditions. Our enterprises do not have the opportunity to announce their technical conditions, since there is no time for this, for the USSR Gosplan assigns funds for acquiring import equipment for no more than

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Cold Press-Working (cont'd)

one year. The broad incorporation of progressive technology -- cold press-working of sheet metal -- is one of the most important ways toward increasing the production of various industrial goods with the most economical expenditure of funds, labor and materials. (Ekonomicheskaya Gazeta, 11 September 1960. Full translation).

[\* Abbreviation unknown.]

MOTOR VEHICLES

New Sports Car

It seems that the automobile does not touch the asphalt, it flies along the highway at such a rate. Painted blue and white, it reminds one of a torpedo plowing through the ocean . . . Racing cars ZIL-112-4 and ZIL-112-5 left this week from Moscow for Leningrad where the national racing championships are being held. Soon racers will receive a new car -- the ZIL-112-S, which is now being assembled in the experimental shop of the Moscow motor vehicle plant. This is a 2-seater with a streamlined aluminum body. The frame is not of sheet steel, as is the rule, but of tubular construction. This made it possible to decrease total weight to 1200 kg. A new type of rear axle with suspended reduction gear and rocking semi-axles results in greater stability, and an improved braking system makes it possible to stop almost instantly while driving at high rates of speed. For ease in operation, the automobile has the country's first hydraulic clutch. The ZIL-112-S can compete with some piston

New Sports Car (cont'd)

airplanes. The new, powerful 8-cylinder engine will have a top speed of 300 km/h. (Moskovskaya Pravda, 28 August 1960. Full Translation).

GZA-56 Truck

One more new product by the Gor'kiy motor vehicle builders -- the GAZ-56 truck -- successfully went through plant and inter-departmental testing. The load capacity of the new machine is 1½ tons. It is designed for hauling various loads both in the city and in the country. (Moskovskaya Pravda, 6 October 1960. Full translation).

Truck Defects

The plant imeni Likhachev received a letter with the following return address: Kremenchug, Road Machinery Plant. The letter read as follows: "On 8 August we received 10 ZIL-157 trucks and found that on 3 of the trucks the window lowering devices did not work and the radiator louvres would not close, while on 4 of them the locks were defective and the cabs were dented." This disturbing letter bothered the Komsomol members. The plant Komsomol committee decided to put on a special satirical broadcast together with the staff of the radio station. Komsomol activists and persons from the editorial staff carefully collected material. And here it is: "Attention! The Komsomol signal from the motor vehicle plant imeni Likhachev is on the air. Listen to our broadcast 'for the reputation of the plant brand.' The programs included essays, parodies, fables and verse, epigrams and jingles. The program was a success. The concrete culprits guilty of producing poor equipment were named, and the poor workmen were criticized. The "Komsomol radio signal" is heard on Mondays. It is interested in everything -- production, sports, recreation.

The editorial staff of the station includes electrician Gertsev, metal worker on the main conveyor line, Popov, a vaudeville quartet of foundrymen, radio station employees Markova, Suyetenko and Apatov. The editor of the program is the plant's deputy secretary of the Komsomol committee, Mazepa. The motor vehicle builders are competing with the collective of the Leningrad metal plant imeni Stalin. Wishing to exchange information in organizing similar programs, the Komsomol activists ~~at the motor vehicle plant~~ are producing a special satirical program for their friends in Leningrad. (Moskovskaya Pravda, 6 October 1960. Full translation)

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#### Carburetor Plant Savings

"We are very happy today," says director of the Carburetor Plant Polyakov. "We are the first in Moscow to completely put our share into the national till. The collective obligated itself to save 1,600,000 rubles by 7 November. Right now, 32 days before the deadline, we announce: 'Here, our country, is what we promised -- a fine holiday gift.'" Who are these "depositors" in the Moscow billion? How is the enterprise able to save hundreds of thousands of rubles in such a short time? Carburetors, gas pumps and shock absorbers -- the plant production -- are produced of cast iron, steel, brass and bronze. Naturally, efficiency ideas are directed toward saving as much metal as possible and replacing non-ferrous metals by ferrous or plastics. (Vechernaya Moskva, 6 October 1960. Partial translation)

### Powerful Dump Truck

Soon the family of Soviet motor vehicles will be joined by a new brand machine -- the BelAZ-540. This super-heavy dump truck is produced at the Belorussian motor vehicle plant, situated in the settlement of Zhodino, Minskaya Oblast. It will replace the former MAZ-525 dump truck. By decreasing the weight of the truck and by introducing several other design improvements, the load capacity of the BelAZ-540 has been increased to 2 tons more than the MAZ-525 and is 27 tons. The speed of the new truck has also been increased and will reach 35 km/h. The engine is 360-375 hp. The designers have improved the design of the knife brake levers, the hydro-mechanical transmission and the pneumatic-hydraulic suspension. By decreasing the length of the truck by one meter, the new machine has become more maneuverable. The BelAZ-540 will be a basis for developing several super-heavy dump trucks. By using standardized components it will be possible to transfer the truck production to production lines. The plant experimental shop has begun to prepare a test model of the new truck for production. (Pravda, 9 October 1960. Full translation)

### Old and New Vehicles

Here's what has happened: the motor vehicle plant has begun to produce new vehicles, but the enterprise conveyor, producing spare parts, is still basically producing parts for motor vehicles which are no longer produced, and the variety of these spare parts is increasing every day. A motor vehicle is improved during the process of production. This is inevitably connected with the replacement of individual parts, sometimes entire components, by new ones. At the same time the production of old parts and components, which the motor vehicle plant has stopped producing, is transferred to other enterprises or stopped completely. As a result the principle of interchangeability of parts is violated -- one of the basic principles of large-series production. It is obvious that our designers, in looking toward the future, are forgetting about the thousands of motor vehicles already produced. And yet it is their duty to think about supplying these machines with spare parts. Because of this it happens that an insignificant innovation incorporated in production, although advantageous for the plant, is not at all advantageous for the national economy.

Old and New Vehicles (cont'd)

For example, at the Gor'kiy motor vehicle plant, in order to effect savings, they simplified the design of the muffler pipe for the GAZ-51 and GAZ-03 trucks, and they began to fasten it to the exhaust pipe not with three but with two bolts. This simplification was really expensive! An exhaust pipe serves for several years, but the muffler intake pipe burns out twice during this time, and sometimes three times. Maintenance men remove the muffler intake pipes together with expensive exhaust pipes and throw everything into the trash heap. On the same GAZ-51 truck they "modified" the cab: they replaced the wooden door with a metal one. This is good: the cab will last longer. But in doing this the designers didn't think about what the maintenance men would put on a truck produced with a wooden door? A metallic door cannot be used for exchange purposes. In addition, the new doors, locks, hinges and window handles do not fit the wooden door. It seems if the glass breaks or the lock goes out of order, you have to replace the whole cab. And there are hundreds of thousands of trucks, the cabs of which are fitted with wooden doors. Things are a little better at other enterprises. The plant imeni Likhachev has begun to produce trucks with a new front suspension, the Moscow motor vehicle builders "forgot" that

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Old and New Vehicles (cont'd)

these should be adapted to the old trucks. Naturally demands for progress in motor vehicle construction dictate the necessity of introducing various improvements, sometimes causing a loss of interchangeability of various components of units. But one should consider what price is being paid for this progress. Wouldn't it be better to carry out these types of experiments on test models? If the necessity arises for modernization on series trucks, please, comrade designers, see to it that the new innovation can be used for the earlier models. Technical councils and inventor and efficiency expert bureaus are obligated not to forget about this. Interchangeability is a definite requirement which should be met by every new motor vehicle part. (Ekonomicheskaya Gazeta, 31 August 1960. Full translation)

MISCELLANEOUS

Non-Standard Equipment Plant

A large plant for producing non-standard equipment for motor vehicle, construction and the timber industry is being constructed in Bobruysk on the basis of small repair shops. Old buildings are being reconstructed and new buildings are going up. They are being equipped with the most modern machine tools and units. The enterprise collective has begun producing truck washing equipment at the plant and the production of conveyor lines for motor vehicle repairs is being organized. Up to 7 motor vehicles can be repaired simultaneously on each line. The enterprise will produce many new items this next year. The mass production of self-unloading trailers is being organized, as well as tremendous paneling carriers and log trucks, and house trailers for worker's vacations in the country. (Sovetskaya Belorussiya, 31 August 1960. Full translation)

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Helicopter  
Helicopter

The scene is the Gor'kiy Motor Vehicle plant, the metal working shop of the thermal shop. Everyone glancing in here is attracted by an unusual structure. Externally it reminds one of a small boat with a blunt bow and one seat in the middle. What is this? A new type automobile? No. Don't be surprised when you learn that this is the . . . cabin of a future single-seat helicopter. Shop metal worker Komsomol member Fesenko, -- member of DOSAAF -- is building in his off hours. Fesenko has dreamed of assembling a small helicopter for a long time. Once the youth read in a technical magazine an article on these prop-winged birds. Since that time the boy has had the "bug". He began to putter around. He immediately came across difficulties. To his aid came the chairman of the primary DOSAAF organization of the thermal shop, engineer Shestakov. The project went along more smoothly. "Our helicopter will be unusual," Fesenko says. "Besides two supporting propellers it will have a third one -- a thrust propeller. Therefore the machine will not only be able to fly but move along the surface: in the summer on water and in the winter on snow."

Helicopter (cont'd)

The helicopter will be equipped with a 120 hp airplane motor. We figure that it will have a maximum speed of 150 km/h. There is nothing left for us to do but wish success to this enthusiastic metal worker in making his dream come true. (Sovetskaya Rossiya, 5 October 1960. Full translation)

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ELECTRICAL POWER EQUIPMENT

Power Engineering Advances

All-out electrification of the country is the basis of the further development of the entire national economy. Without electrification it is impossible to move heavy industry, transport and agriculture, as well as consumer goods forward successfully and rapidly. It is impossible to raise the level of production and standard of living. In the Resolutions of the 21st Party Congress, in the speech by Khrushchev at the All-Union Power Engineering Construction Conference, an analysis was given of the status of power engineering construction in the country, and a program for future operations was outlined. The long-term plant of electrification is an important component part of the program for building Communism. During the years of Soviet power truly tremendous successes have been achieved in the field of developing electrical power engineering. In comparison with 1913, the production of electricity in 1958 increased one hundred twenty-fold with a threefold general

Power Engineering Advances (cont'd)

production increase of means of production.

Hydro-turbine construction in our country began early during the Soviet period. Soviet hydro-turbine construction, from its initial stages, developed rapidly, at the necessary rate. The leading role in this area belongs to the Leningrad Metal Plant. Many hydro-electric power stations built in our country are equipped with turbines produced in Leningrad. In Leningrad, at the Metal Plant and "Elektrosila" the world's largest hydro-turbines with 9.3 m in diameter rotary blades were produced, at 126,000 kw capacity and generators for them, installed at the Volga GES imeni Lenin and the Stalingrad GES. At present the metal plant and "Elektrosila" Plant are producing even more powerful turbines and generators -- 226,000 kw -- for the Bratsk GES. The technical planning has begun for 500,000 kw hydro-turbines for the Krasnyarsk GES. One Krasnyarsk turbine will develop a capacity 8 times greater than the pioneer of Soviet hydropower engineering -- the Volkhov hydroelectric power station, which has 8 hydro-turbines at 8,000 kw apiece. This one fact alone characterizes the path traversed by Soviet power engineering during the years of Soviet power. The turbines for the Krasnyarsk GES are already being designed. But before the design is incorporated in metal it is necessary to carry out many design and calculation operations and solve complicated technical problems.

Power Engineering (cont'd) ... and reliable design elements for these hydro-turbines.

Electric power. The turbines for the Krasnyarsk GES are already being designed. But before the design is incorporated in metal it is necessary to carry out many design and calculation operations and solve complicated technical problems connected with the designing of stable and reliable design elements for these hydro-turbines. Increase in machinery elements load demands more careful calculation and more accurate determination of the design load capacity. Suitable materials are essential, which assure absolutely reliability of machinery in operation. In producing hydro-turbines it is necessary to produce at one time the entire consignment of turbines to be installed at the electric power station and it is therefore impossible to perfect the master model ahead of time. New design solutions must be checked on models or experimental mechanisms.

The scientists of Moscow, Leningrad and other cities are aiding in the solution of the complicated technical problems. In the Leningrad Polytechnical Institute, in the hydro-machinery laboratory, phenomena are being studied on hydraulic stands, which take place in the turbine flow sec-

Power Engineering Advances (cont'd)

tion under reversible and non-calculated operation conditions. The results of these studies will find practical application in building the turbines for the Krashinoyarsk GES. In the aerodynamics laboratory, optimum element forms for the turbine flow sectors are being determined on a stand. In the materials resistance laboratory, problems of turbine element strength are being studied. In the next few years new hydro-turbines -- horizontal -- will be required for several hydro-machines: they will simplify and lower the cost of the sub-surface section of the hydroelectric power stations. At present, the Central Boiler Turbine Institute imeni Polzunov is drawing up the rough plans for capsule horizontal hydro-turbines. Various hydro-unit arrangements are being examined -- with a direct connection between the generator and the turbine, and with the aid of a reduction gear. These studies will make it possible to use small high-speed generators and increase the flow cross-section of the turbine. We must mention that in Soviet hydro-turbine construction diagonal turbines with reversible blades, which make it possible to work with more kw/h under changing operation conditions under high pressure, are not yet

Power Engineering Advances (cont'd)

being used. Problems of reversible hydro units which can work under turbine and pump conditions at hydro-accumulation hydroelectric power stations have not yet been solved. In order to lower the cost of construction of electric power stations, in many cases there is a necessity of using new combinations with decreased size of the turbine flow section. Fulfillment of the long term plan for electrification requires a great increase in electric power equipment production, chiefly with an increase in unitary capacity. Turbine construction is naturally joined closely with hydroelectric power station parameters, water pressure and water expenditure into the river. Therefore it is necessary for each hydroelectric power station to carry out serious technical-economic research, to determine the most effective unit capacities. Such research is being conducted in the Central Boiler Turbine Institute imeni Polzunov. It is not always the most powerful turbine which will be the most effective according to technical-economic indices. For many hydroelectric power stations it is more expedient to use less powerful turbines with comparatively lower water

Power Engineering Advances (cont'd)

pressure.

The plan for the further development of electrical power equipment construction is grandiose. The electrical power equipment builders of Leningrad have the great honor of actively participating in its fulfillment. But for this it is necessary to increase the production of electrical power equipment to a considerable degree at the present production facilities in our city. It is necessary to increase labor productivity, less labor on each kw of machine capacity. For this it is necessary to simplify turbine design to the maximum possible, to improve the form of the flow section. All of this will make it possible to decrease size and to lower the cost of constructing electric power stations. The planning of powerful hydro-turbines requires a considerable expansion in experimental research. Besides forming new experimental facilities, attention should be focused on a better use of existing stands. In order to increase the number of hydro-turbines produced, in our opinion, it would be expedient either to build a new shop at the Leningrad Metal Plant for the production of welded elements, or procure them from another enterprise by means of inter-enterprise cooperation.

Power Engineering Advances (cont'd)

prise by means of inter-enterprise cooperation. This will make it possible to use existing production space more effectively, production space which is equipped with machine tools and powerful hoist cranes. In order to solve the tasks of technical progress in Soviet hydro-turbine construction it is necessary to conduct extensive scientific research on machinery flow sections, the mechanical durability of components and parts, technology, automatic operations and hydro-turbine regulating. In spite of the generally successful fulfillment of scientific research on hydro-turbine construction, which has made it possible for Soviet industry to build powerful reversible-blade and radial-shaft turbines, there are many serious defects in the organization of scientific research.

First of all we must say that in Leningrad there is basically no essential experimental-research base. For example, the hydro-turbine laboratory at the metal plant, built in 1924, does not meet the requirements of the modern age. It must be completely reconstructed or built from

Power Engineering Advances (cont'd)

the ground up. However, the plant is in no hurry to build a new laboratory. The laboratory hydro-turbine base in the Central Boiler Turbine Institute imeni Iolzunov is also being formed extremely slowly. Things are going poorly with the coordination of scientific work. Various organizations are occupied simultaneously with many scientific problems which are being worked out without coordination, "every man for himself." Unnecessary parallelism in subject matter, lack of coordination in directing scientific research lead to a superfluous overloading of experimental stands, to a waste of personnel and funds. Many unsolved problems are actually not being examined, and some projects, although included in the plans of many organizations, are not being carried out to a sufficient degree. Four organizations are engaged in developing the flow sector for the Krasnoyarsk GES turbines: In Leningrad, the metal plant and the polytechnical institute, in Khar'kov the sovnarkhoz and the polytechnical institute. Seven organizations are working parallel on research of horizontal hydro-unit flow sectors. Certain other subjects of great economic significance such as, for example, the development of reversible

Power Engineering Advances (cont'd)

hydro-units, are not being studied at all. Such an important subject as the development of 200 m pressure radial-shaft turbines is being studied on a limited basis. It is clear that it is necessary to review scientific research plans for hydro-turbine construction, distributing each subject to a specific organization. The subject matter of scientific research for many organizations will be cut down in variety, but the projects will be carried out more thoroughly and qualitatively. In cases whereby it is expedient to use the joint work of several organizations for a particularly important subject, a coordinated program of operations is necessary and, naturally, it is necessary to have a well organized exchange of information. A master organization should be appointed which would answer for the timely and qualitative fulfillment of experimental material on the given subject, would check the work of all the other organizations engaged in projects on this subject. (Leningradskaya Pravda, 11 September 1960. Full translation)